

## **Syllabus of CIA**

**B. Sc (Chemistry) Semester –V, October-2025**

### **Paper I: Inorganic and Organic Chemistry-V**

#### **Unit -I Coordination Compounds**

Werner's coordination theory and its experimental verification, Effective Atomic Number concept, chelates, nomenclature of coordination compounds, isomerism in coordination compounds, Valence Bond Theory of transition metal complexes with reference to tetrahedral, octahedral and square planar complexes, Back bonding, limitations of Valence Bond Theory

#### **Unit-IV Organometallic Compounds**

The Grignard reagent- preparation, structure and chemical reactions, Organozinc compounds- preparation and chemical reactions, Organolithium compounds- preparation and chemical reactions.

### **Paper II: B Organic and Physical Chemistry-V**

#### **Unit -I Carbohydrates**

Classification and nomenclature, monosaccharides, mechanism of osazone formation, inter conversion of glucose and fructose, chain lengthening and chain shortening of aldose. Configuration of monosaccharides. erythro and threo diastereomers. Conversion of glucose into mannose, formation of glucosides, ethers and esters. Determination of ring size of monosaccharides. Cyclic structure of D (+)-glucose. Mechanism of mutarotation. An introduction to disaccharides (maltose, sucrose and lactose) and polysaccharides (starch and cellulose) without involving structure determination.

#### **Unit III Electrochemistry-II**

Types of reversible electrodes, gas metal ion, metal-metal ion, metal insoluble salt-anion and redox electrodes. Electrode reactions, Nernst equation and single electrode potential. Standard hydrogen electrode, reference electrodes, standard electrode potential, electrochemical series and its significance. E.M.F and its measurements. Electrolytic and Galvanic cells-reversible and irreversible cells. Calculation of thermodynamic quantities of cell reactions ( $\Delta G$ ,  $\Delta H$  and  $K$ ). Polarization and overvoltage. Concentration cell with and without transport, liquid junction potential. Potentiometric titrations.

### **Paper III: Analytical Chemistry-V**

#### **UNIT I Electrogravimetry**

Theory, electrode reactions, overpotential, completeness of deposition, electrolytic separation of metals, character of the deposit, electrolytic separation of metals with controlled cathode potential. Electrolytic determinations at constant current copper and lead. Electrolytic determinations with controlled cathode potential – Antimony, Copper, Lead and Tin in an alloy.

Coulometry Principle of Coulometry, coulometry at controlled potential, separation of Ni and Co by coulometric analysis at controlled potential, coulometry at constant current, coulometric titrations.

## **UNIT II Polarography**

Principle and experimental set-up. Diffusion current and half-wave potential, Qualitative and quantitative applications of polarography in analytical chemistry-(i) Wave height concentration graph (ii) Internal standard (Pilot ion method) (iii) Standard addition method (iv) Use of polarography in : (a) Zn and Cu in brass (b) Dissolved oxygen in the sample